

# Industry-Recognized Credentials: National Best Practices and Applications to Massachusetts



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# Industry-Recognized Credentials: National Best Practices and Applications to Massachusetts

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## Table of Contents

Executive Summary.....	4
Expanding Career Readiness with Industry-Recognized Credentials.....	8
Credential Programs Across the Country.....	10
National Best Practices.....	12
The Need for an Industry-Recognized Credentials Program in Massachusetts.....	19
Leveraging Massachusetts’ Strengths for an Industry-Recognized Credential Program.....	20
Critical Next Steps.....	25
Addendum.....	29

## EXECUTIVE SUMMARY

As the country transitions to a technology and knowledge-based economy, 65% of employers nationwide report difficulty finding qualified candidates for open positions, compelling state and local governments to put preparing students for future careers at the top of their agenda. Statistics support the need to focus more on career readiness initiatives to address the demands of modern jobs and the shortage of skilled workers.

According to Georgetown University's Center for Education and the Workforce, by 2020, two out of three jobs will require some education or training beyond high school.<sup>1</sup> In Massachusetts, the impact of this will be felt even more acutely, with the percentage of such jobs estimated at 72%. A National Skills Coalition report estimates that in 2015, middle-skill jobs (those that require more education than high school but less than a four-year degree) accounted for 46 percent of Massachusetts' labor market, but only 35 percent of the state's workers are trained to the middle-skill level.

One way states are taking action to address the skills gap is through the implementation of programs that provide high school students opportunities to earn industry-recognized credentials tied to labor market demand. Last year, high school students across the country earned over 780,000 industry-recognized credentials. Research shows that students who earn an industry-recognized credential have higher high school graduation rates, postsecondary enrollment rates, and employment rates than peers that do not earn a credential.

### Best Practices

So what are the essential elements of a successful state credential program?

Massachusetts can learn a lot from other states that have expanded access to industry-recognized credentials, which would allow the Commonwealth to build off the momentum created by its recent efforts to ensure student post-graduate success. In Florida, where high school credentialing programs began in 2007, students earned over 86,000 credentials during the 2017-2018 school year. In Ohio, students can earn a credential in 13 career fields with a choice of over 250 credentials. Delaware began its program in 2014 and plans to place 20,000 students in career pathways by 2020. Students in Delaware can earn credentials in fields such as finance, healthcare and information technology.

As the number of states implementing these programs has expanded, an inventory of best practices for establishing and sustaining industry-recognized credential programs provides a roadmap for Massachusetts to build off of some of its own career readiness efforts to better serve all our high school students.

Cutting across all of the best practices listed below is an essential focus on identifying credentials in high-wage, high-growth industries and incentivizing programs that promote the attainment of these credentials in high school.

These best practices are as follows:



#### **Providing an Incentive**

Successful states encourage school districts to offer industry certification courses to students by creating a financial incentive tied to performance and/or by adopting these industry-recognized credentials into the school accountability rating system.



#### **Labor Market Alignment**

States use labor market data from their workforce agencies and workforce development boards to identify the credentials most in-demand and focus their programs to meet those needs.



#### **Data Collection and Reporting**

Data collection and reporting allows states to identify progress in certain credentialing areas, monitor and assess student interest and program quality, and analyze the demographics of credential earners to ensure equal access.



#### **Employer Engagement**

Employer engagement and communication helps inform which pathways and occupations are in demand, and the education and training students need, leading schools and districts to better align offerings with labor market need.



#### **Interagency Collaboration and State Policy**

Collaboration between state agencies and coordination of various state policies ensures these programs serve students and business well. Each stakeholder undertakes distinct aspects of the work in close collaboration with public and private sector partners.



#### **Statewide Communication**

States must promote credential programs to schools, districts, and the students to be served, as well as to their families. Every stakeholder must be a part of the communication strategy to inform students and parents of the opportunity to earn industry-recognized credentials and the benefits of doing so.

Three states stand out in their adherence to best practices in the identification of high-value credentials, the promotion of their availability to high school students, the actual awarding of

credentials to their students, the tracking of outcomes and the leveraging of public-private partnerships to facilitate and sustain their programs. These states also utilize financial incentives to expand student participation in these programs.

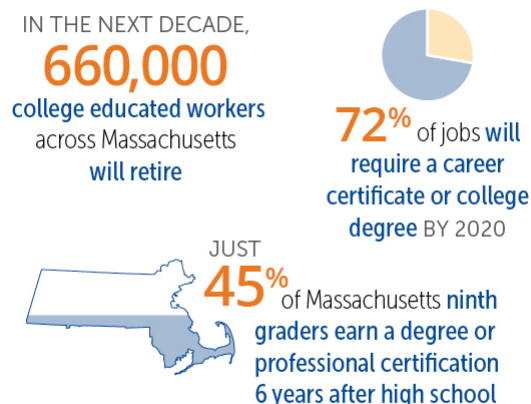
**Florida** maintains a rigorous process to add credentials to a state published list identifying high-value credentials that are aligned with employer demand and that are eligible for an incentive.

**Kansas'** Department of Education uses its \$50,000 communications budget to develop brochures, videos, posters and other resource materials to promote the credential program.

**Louisiana's** regional public-private partnerships between secondary and postsecondary institutions and industry have led to the development and approval of 47 graduation pathways in a variety of career fields, each resulting in an industry-recognized credential.

## The Opportunity for Massachusetts

Massachusetts faces an impending workforce shortage, with 660,000 college-educated workers expected to retire over the next decade and the demand for workers to fill middle-skill jobs expected to exceed supply. Seventy-five percent of Massachusetts employers currently have trouble finding people with the right skills to fill open positions. While the state's K-12 public education system leads the nation in student achievement, many students attending Massachusetts public 2-year colleges fail to earn a degree or credential. These facts demonstrate an important need to better prepare students for workforce opportunities.



Massachusetts' high-performing career vocational technical education system is a strength in its ability to prepare students well for college and careers, but it only serves 20% of high school students in the state and does not currently have the capacity to meet student demand.

In November 2019, Massachusetts passed the Student Opportunity Act, legislation that will increase K-12 education funding by \$1.5 billion over seven years. The new law places a greater emphasis on preparing students for college and the workforce by requiring local school districts to consider, and report on, what strategies they will employ as part of the three-year implementation plans they are required to develop and submit to the state, outlining how new funding will be spent. New state funding being made available to districts could provide a source of revenue to create and expand specific college and career readiness initiatives.

Additionally, for the first time, the state, as directed in the legislation, will collect and report data that will allow the public and policymakers to know whether our public schools are adequately preparing students for success after high school. The Secretary of Education will be responsible for monitoring progress on college and career readiness at the state, district, and school level and will begin the process of establishing targets for improved outcomes.

Further, Massachusetts has already done a lot of heavy lifting to assemble labor market data through the creation of Regional Labor Market Blueprints. Interagency collaboration, in the form of the Workforce Skills Cabinet, is already happening. Employers remain eager to engage in efforts to address workforce needs and prepare students with the skills and credentials they need to succeed in the workplace.

Massachusetts has also invested in “Innovation Pathways” programs within high schools that connect students’ learning to a particular career pathway through college-level coursework and work-based experiences. These programs allow students to gain vital experience in growing industries, get prepared to meet the needs of employers seeking skilled labor, and gain real work experience relevant to broad industry sectors.

Massachusetts is well-positioned to be a leader in aligning teaching and learning with workforce opportunities. Many important components of the infrastructure necessary to support a strong credentials-awarding program have already been developed.

This report examines national best practices and the landscape of these programs across the country and how the awarding of industry-recognized credentials to high school students is helping to close the gap in filling vacancies in key occupations. By reviewing the current infrastructure in place in Massachusetts, this report will also set the context for public and private sector action to scale up the awarding of these credentials to expand opportunities for the students of the Commonwealth.



## **Expanding Career Readiness with Industry-Recognized Credentials**

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Employers across the country struggle to find qualified candidates for open positions in their companies as well as the talent they need to lead and grow those companies. At the same time, far too many high school graduates lack the skills that employers need and the critical thinking skills essential for success in college.

According to the 2016 ManpowerGroup Talent Shortage Survey, skilled trades were the hardest jobs to fill in the U.S. for the 7th consecutive year. Globally, IT jobs are the second hardest to fill. Meanwhile, according to the Foundation for Excellence in Education, almost 1 million U.S. high school completers in 2015 did not enroll in college the following fall, which is roughly one in three high school graduates. Even those who have enrolled in college do not necessarily complete: nationwide, over 700,000 students from the 2011 cohort did not complete college within 150 percent of the expected time to complete, and almost 267,000 were still enrolled in college six years later.

Similarly, the Foundation states, Complete College America reports more than 50 percent of students entering two-year colleges are placed in remediation – almost 40 percent of them never complete remediation, and fewer than 10 percent will earn a degree in three years or fewer.

In response, states are taking steps to better align their education systems with the demands of the modern economy, creating more college and career preparation programs for high-wage, high-demand fields. Several states have adopted strategies to increase opportunities for high school students to earn industry-recognized credentials tied to labor market demand.

Industry-recognized credentials are used by employers to certify that an applicant is qualified for a job. These certifications are globally portable and often “stackable,” meaning multiple credentials can be accumulated over time to build up an individual’s qualifications to pursue a career pathway or another postsecondary credential.

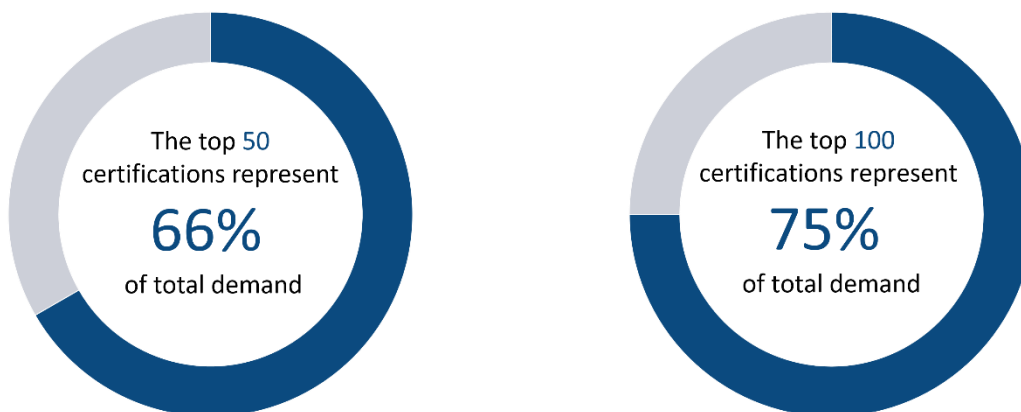
In its most simple definition, a credential is a verification of a qualification issued by a third party. However, there are several different types of credentials, ranging from the validation of basic office skills to the certification of highly specified technical skills<sup>ii</sup>. Below are the five types of credentials, their values and examples:

- **License**
  - Mandated by law for workers to gain permission to practice in specific occupations. Examples include Commercial Driver’s License and Licensed Practical Nurse.
- **Certification**
  - Signals a set of abilities that prepares prospective employees to perform a specific job. Examples include Automotive Service Excellence and CompTIA Network+.

- **Software**
  - Signifies competence in specific software. Examples include Adobe Certified Expert and Microsoft Office Specialist.
- **General Career Readiness**
  - Foundational workplace skills, basic reading academic abilities, workplace safety and life support. Examples include W!SE Financial Literacy and Basic First Aid.
- **CTE (Career and Technical Education) Assessment**
  - Skill attainment of students who have completed a program course sequence or CTE pathway.
  - Mastery of State standards
    - Not necessarily aligned with or approved by industry body or hiring processes.<sup>iii</sup>

Not all credentials are created equal. Some credentials are quite popular among students, but do not lead to jobs that pay family-sustaining wages and offer career ladders.

According to an analysis of job postings by Burning Glass Technologies, two-thirds of all certification requests in 2015 asked for one of the top 50 certifications and the top 100 certifications represent 75% of total demand.



This demonstrates that not all credentials are in high demand. The focus of any initiative should be on high-value credentials.

**4% of employer-requested certifications account for 75% of demand**

Earning high-value credentials in high school can expose students to a variety of career paths and sets them up for success. As more jobs require postsecondary education and training, an early start is especially important. High-value credentials also serve as an indicator for employers that

students have the knowledge and skills to be successful in the workplace. And when employers engage with schools to identify the right credentials, there is a significant benefit for both students and employers because these credentials are aligned with workforce demand and create a pathway to good jobs.

While states have only just begun to track longitudinal data on student impact, job placement and college persistence, the early results are encouraging. Data from Florida show that students who graduate from high school with an industry-recognized credential outperform peers who graduate without one by several academic measures. Students enrolled in IRC programs demonstrate higher:

- GPAs;
- Graduation rates; and
- Postsecondary enrollment rates.

Greater GPA, Graduation Rate, Acceleration	Career Pathway & Certification	Non-Career Pathway & No Certification
GPA	3.09	2.69
High School Graduation Rate	97.2%	67.0%
Acceleration	48.7%	31.7%

Career and Professional Education Act Enrollment and Performance Report, 2015-16, Florida Department of Education

Students also had higher placement rates in employment following high school graduation and surpassed peers in overall average earnings by the third year of employment.

## Credential Programs Across the Country

In 2018, high school students across the country earned 783,561 industry-recognized credentials. Below are examples of how states are implementing programs that put such credentials in the hands of their high school students prior to graduation.

**Delaware** and **Ohio** integrate credentials into the school curriculum and career preparation activities like work-based learning opportunities and internships.

**Delaware** established its Delaware Pathways program in 2014 with 27 students in an advanced manufacturing pathway. The state saw a growing gap between the needs of employers and the skills students possessed as well as a gap in the number of black, Hispanic and low-income students who left high school with the skills to pursue higher education or a middle skill job. Today, there are 14 pathways serving over 9,000 students in fields such as finance, healthcare and information technology. In collaboration with business, secondary and postsecondary institutions and families, Delaware aims to enroll 20,000 students in pathways by 2020.

In **Ohio**, students can earn industry-recognized credentials as one of 13 career fields with a choice of over 250 in-demand credentials. The program is included in one of three pathway options for high school graduation supported by the Ohio Department of Education. The program was developed in 2014 by a coalition of 15 school districts, Columbus State Community College, and various community and business partners in four industries –

Information Technology, Logistics, Healthcare and Advanced Manufacturing. Students in any district can sign up for an industry-recognized credential course. Ohio includes the awarding of industry-recognized credentials as a measure of how well schools prepare students for life after high school on school report cards.

**Florida, Wisconsin and Louisiana** have implemented similar models, but have adopted incentives – bonus funding for schools and districts for each student who earns an industry certification – to dramatically increase the number of students earning high-value industry-recognized credentials in high-wage, in-demand fields. As a result, these states see student demand and enrollment in the program increase year over year. Each state’s incentive program was created by an act of the legislature and receives its funding through legislative appropriation.

**Wisconsin’s** program was enacted by the state legislature in 2013 and capped funding at **\$3 million** with incentives set at \$1,000 per student. Funding is limited to \$1,000 per pupil regardless of the number of approved credentials students earn. The program was oversubscribed in its first year and incentives were prorated at \$882 per student. In 2018, the program budget increased to **\$3.5 million**. Student demand for this program continues to grow. The incentive program is managed by the Department of Workforce Development

**Louisiana’s** program began in 2014 with **14,473** students who earned national or state industry-based credentials. In 2017, over **41,000** high school students attained a credential. Louisiana distributes incentives through its Career Development Fund which is uncapped and currently stands at \$12 million. The incentive rate is \$241 per student, per credit for each student who enrolls in an industry-recognized credential course in a high demand pathway through the JumpStart career diploma pathway. For example, if students participate in a two-credit course and a two-credit internship, the school would receive \$952 as an incentive. After four years of implementation and increasing student demand, 2018 was the first year in which industry-recognized credential courses were a requirement for high school graduation. The program is run through the Louisiana Department of Education.

**Florida’s** program is the oldest. It was enacted by the legislature in 2007 and is funded through the Florida Education Finance Program which funds the operation of schools. The program began with 803 students earning industry certifications. The initial cost of the incentive program was \$550,000 for the 2007-2008 academic year. By 2015-2016, the state investment was \$50 million as a result of rising student demand. Incentives ranged from \$416-\$832 per student in 2016-2017. During the 2017-2018 school year, 105,131 students earned over **120,000** industry-recognized credentials. Student enrollment in the program continues to rise each year. Florida has included industry certifications in high school grading formula since 2010.

The success of these state incentive models captured the attention of other states searching for an innovative solution to close the skills gap. In addition to those already mentioned, the following states enacted legislation between 2016-2017 to appropriate funds to create incentive programs for students to earn industry-recognized credentials:

## State Appropriations to Create Industry Recognized Credential Incentive Programs (2016-2017)

**Colorado:** \$1 million annually

**North Carolina:** \$600,000 for 2016-2017

**Nevada:** \$2.9 million

**Minnesota:** \$1 million annually

**South Carolina:** \$3 million for 2016-2017

## National Best Practices

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The experience of other states has led to the identification of best practices for launching and growing industry-recognized credentials programs. Cutting across all of the best practices is an essential focus on identifying credentials in high-wage, high-growth industries and incentivizing programs that promote the attainment of these credentials in high school.

The best practices are as follows:

1. *Incentivize High-Value Credentials*
2. *Labor Market Alignment*
3. *Data Collection and Reporting*
4. *Employer Engagement*
5. *Interagency Collaboration and State Policy*
6. *Statewide Communication*

### 1. *Incentivize High-Value Credentials*

The use of labor market data and robust data collection and reporting in conjunction with employer verification creates a rigorous approval process which helps states identify high-value credentials. But to grow their programs, states like Florida, Kansas and Louisiana utilize financial and accountability incentives. States that have not instituted such incentive programs have seen less growth in student participation.

**Kansas** created *Excel in CTE* in 2012 to identify and incentivize credential attainment in high-demand occupations and to prepare more secondary students for the workforce. The Excel in CTE program offers an incentive of \$500, which was previously \$1000, for each student that graduates with an approved credential or attains a credential within six months of graduation. Funds are used to pay for certification exams. This has significantly increased the number of Kansas students graduating with credentials.

- During the 2011–12 school year, 584 students earned industry-recognized credentials. The number of industry-recognized credentials earned more than doubled during the 2015-16 school year with over 1,500 students earning a credential in a high-demand industry within six months of graduation.
- During the 2017-18 school year, students earned 1,420 industry-recognized credentials, a slight decline due to a decrease in state funding in 2015-2016 from \$1.5 million to \$50,000.

**Louisiana** launched the *Jump Start* program in 2014 to provide students with alternative pathways to high school graduation and to increase the number of students earning industry-recognized credentials in high-demand fields. Louisiana employs a different approach – in addition to financial incentives, the state has restructured the accountability system in 2014 to:

- Weigh career diplomas equally to standard diplomas.
- Reward schools with 100 points toward their Graduation Index Score for students who graduate with a standard diploma or a Jump Start career diploma.

Through regional public/private partnerships involving representatives from secondary and post-secondary education as well as industry, the state has developed and approved 47 graduation pathways in a variety of career fields each culminating in an industry-recognized credential.

**Ohio** did not originally offer a financial incentive, but instead established an industry-recognized credential program that offers students an alternative pathway to fulfill requirements toward high school graduation in 13 career and technical fields. While this option was geared toward career and technical education, any student could enter into a pathway to earn credentials. Yet, only 4% of Ohio students statewide are earning industry-recognized credentials. That percentage drops even lower in suburban and urban districts. Even for students enrolled in a CTE pathway, only 21% earn credentials<sup>iv</sup>.

To address this issue and increase students' career-focused learning, in 2019, Ohio passed a bill to enact a series of industry-recognized credential initiatives which includes \$8 million to reimburse school districts for students who earn a credential included in the Ohio Department of Education's list of eligible credentials, and \$12.5 million through the Innovative Workforce Incentive Program for high school students earning a credential in a high priority sector. Through this program, these high-value credentials are eligible for an additional \$1,250 incentive<sup>v</sup>. Ohio's transition to an incentivized credential program underscores the importance of considering the offer of a financial incentive to schools in order to expand access to credential programs for students.

## **2. Labor Market Alignment**

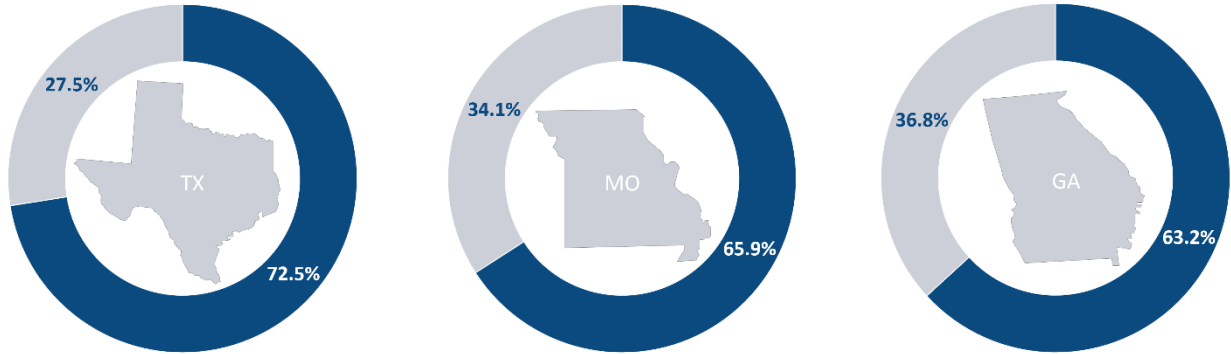
One of the most critical elements of success for credentialing programs is the alignment of the industry-recognized credentials which students earn with labor market information. The industry-recognized credentials which schools offer must be of high value and in-demand by employers. They must be credentials that can provide a pathway for students to jobs in industries with growth and good wages.

States use labor market data from their workforce agencies and workforce development boards to identify the credentials that are in-demand.

Currently, there are a few states where alignment is high for particular industries or sectors. The value of a specific credential is determined by whether the credential earned is in-demand by, and aligns with, employer needs in a particular sector. For example, 72.5% of the STEM

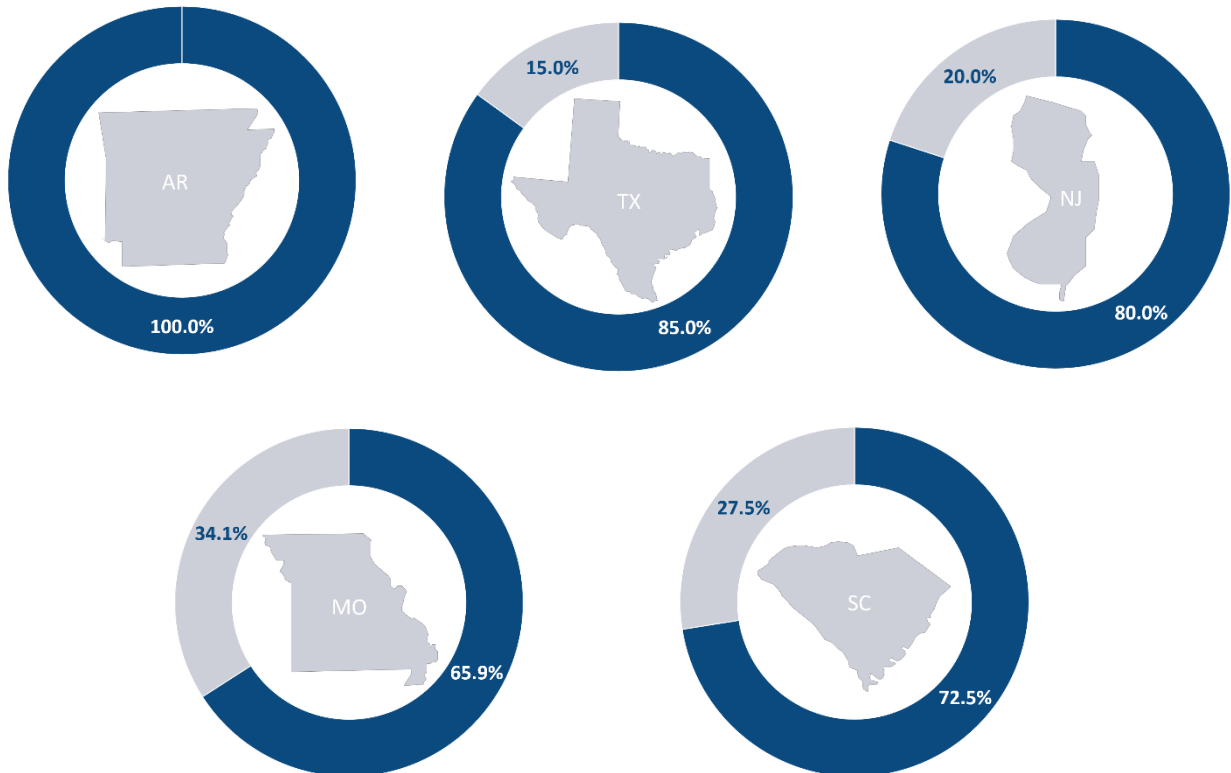
credentials earned in Texas are valued by employers. In Missouri that number is 65.9% and in Georgia it is 63.2% of the STEM credentials earned.

### STEM

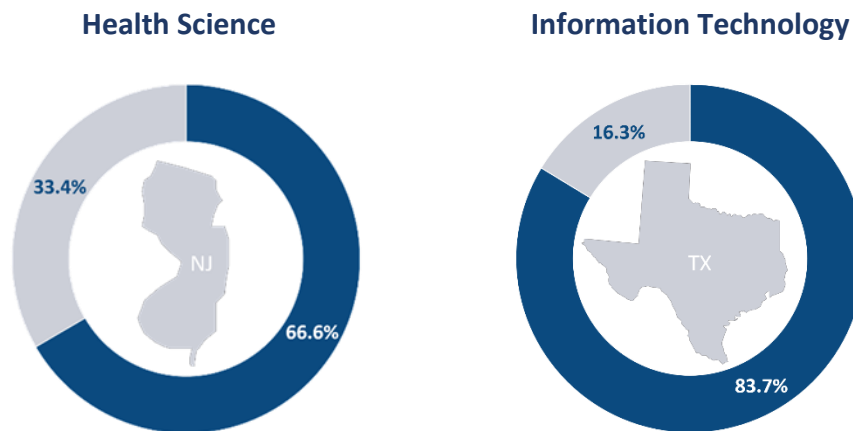


For manufacturing, there are five states where more than 70% of manufacturing credentials earned are valued by employers.

### Manufacturing



Yet, in examining health science credential alignment with demand, only New Jersey is above the 50% mark with 66.6% of credentials earned in health science aligned with employer demand. For Information Technology (IT), Texas is the furthest along with 83.7% of credentials earned in IT aligned with employer demand.



While no state is highly aligned across all industry sectors, there are areas of moderate to high alignment which indicate that these states are making use of labor market data, though further work must be done to improve alignment across all industries.

### **3. Data Collection and Reporting**

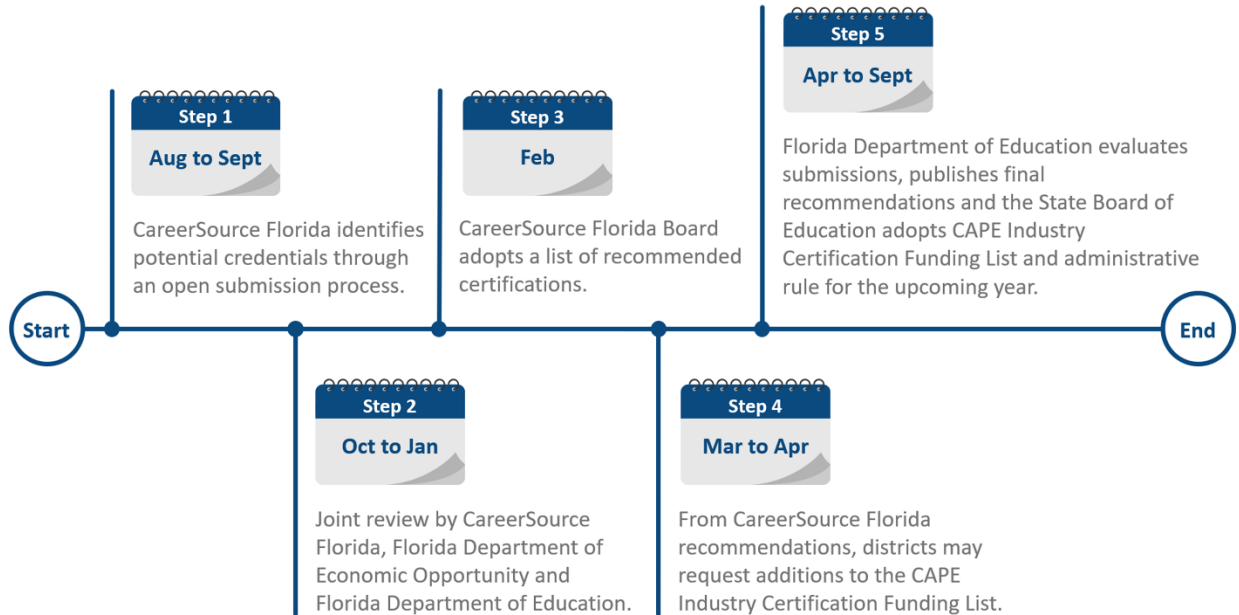
States that have implemented a credential program begin by auditing their current programs for quality and alignment with labor market demand. This process helps states identify what credentials students currently earn, which are in-demand, which are high-value and which do not lead to jobs or careers in high-wage, high-demand fields. There are 28 states that collect individual credential data at either the secondary or postsecondary level. (A map of these states can be referenced on page 25 of the report and a list of states can be found in the Addendum.)

Data collection and reporting is also critical to sustaining the credential program by identifying credentials which may be in high demand by students, analyzing the demographics of credential earners to ensure equality of access and ensuring the ongoing alignment of credentials offered with employer demand.

In addition to collecting individual credential attainment data, many states also maintain a high-value credentials list. This is a list of high-value credentials approved by the state for credential programs in high schools. For example, Florida maintains a rigorous approval process to approve and add credentials to the state's published list. Districts and teachers are then eligible for incentive funding for each student who earns a credential from the approved list.



## Florida Credential Approval Process



Florida Department of Education

State workforce and education agencies collaborate to identify the regional and state jobs that are in-demand, that require high-skill workers and deliver high-wages. These approved credentials are then made public and populate the list of approved industry certifications that are eligible for additional funding or an incentive, depending on that state's program. Employers and schools collaborate to identify local demand and partnering opportunities. Identifying and aligning high-value industry-recognized credentials with employer needs is a process that must be refined and iterated as labor market needs evolve. The process of collecting, reviewing and verifying the data with stakeholders such as employers, will help to improve the alignment of credentials offered or earned with employer demand.

### 4. Employer Engagement

There are several ways that employers work with states to establish and help sustain industry-recognized credential programs. In fact, business engagement and collaboration is vital to success. The most important role business plays is to inform which pathways and occupations are in demand now and which will be in demand in the next 5-10 years<sup>vi</sup>.

Working in collaboration with schools and districts, the state can help employers directly communicate the specific jobs in demand, and the necessary education and training that students need. For example, employers may not include credentials in their job recruitment listings despite the fact that credentials may be required or desired for the position. Working together with educators and school districts, employers can make this information more readily available, inform which credentials have value and assist schools and districts in the development of credentialing programs.

In states that have enacted credential programs, employers have been at the table communicating their needs and working with schools to create opportunities for students to apply their newly acquired skills and learning in the workplace. This takes on many forms, ranging from internships to work-based learning opportunities and apprenticeships in career pathways. Below are examples of national engagement by business to provide access to industry-recognized credentials:

### Examples of Business Engagement in Industry-Recognized Credential Programs

**Graduation Alliance** works to give students the resources, support and flexibility they need to reach their educational goals and prepare for the future through online job training courses. In collaboration with local and national employers, the Graduation Alliance:

- Develops and facilitates skill certification packages with tailored support for students;
- Offers work experience, internship programs and job placement; and
- Partners with institutions to provide pathways to post-secondary education and training, including preferential enrollment, dual credit opportunities, and early financial aid reviews.

The **Business-Higher Education Forum (BHEF)** is a membership organization of Fortune 500 CEOs, college and university presidents, and other leaders dedicated to the creation of a highly skilled future workforce.

BHEF has partnered with higher education and business to embed digital content and skills into a range of domains. With funding from the JP Morgan Chase Foundation, BHEF collaborated with twelve universities to develop credentials that certify mastery of a basic digital skill set. Experts partnered with companies and faculty at universities to develop the content and companies supplemented coursework by offering internships, job shadowing and mentoring to students enrolled in or completing the curricula.

## **5. Interagency Collaboration and State Policy**

Collaboration between state agencies, such as the departments of elementary and secondary education, higher education and workforce and labor, and the alignment of various state policies are critical best practices for ensuring implementation and sustainability of credential programs. Establishing these programs and ensuring that they serve both students and businesses well requires each stakeholder to undertake distinctive aspects of the work.

Collaboration should also extend to all stakeholders from education to business to workforce development boards and professionals. This allows for verification that certain credentials are suitable for high school students to earn. State policy should align with these efforts by promoting and supporting expanded access to career preparation for all students and encouraging collaboration between agencies.

## **6. Statewide Communication**

All partners must be a part of the communication strategy to inform students and parents of the opportunity to earn industry-recognized credentials. States like Ohio and Kansas have funded communications and marketing efforts to increase awareness of industry-recognized credential programs and their benefits to students.

The Ohio Department of Education has a comprehensive state website which provides extensive information on the industry-recognized credentials it offers and a Frequently Asked Questions fact sheet as well as information about implementing a new credential program<sup>vii</sup>. It also provides information for students about credential program options such as the Senior Only Credential Program for 12<sup>th</sup> grade students. Ohio makes it easy for students and families, schools and businesses to learn more about the credential program.



Kansas provided \$50,000 toward the Department of Education’s communications budget for a statewide education campaign. The Department developed brochures, videos, posters and other resources.



Louisiana targeted schools and families through an awareness campaign. They utilized videos, statewide contests and a text response system to increase awareness and understanding of its program.

State agencies involved in developing and publishing the list of high-value credentials work together to notify schools and districts as well as students, parents and other stakeholders.

## **The Need for an Industry-Recognized Credentials Program in Massachusetts**

Nearly 660,000 college educated workers across Massachusetts will retire in the next decade and 75% of employers have trouble finding people with the right skills to fill open positions. Meanwhile, 72% of jobs in the state will require a career certificate or college degree, yet 84% of the state’s students attending public 2-year institutions of higher education do not complete their degree within 6 years. According to the Executive Office of Labor and Workforce Development, the state expects that in manufacturing, information technology and health care, the number of jobs that go unfilled in Massachusetts could reach 25,000 by 2024. A growing workforce shortage threatens economic growth and opportunity if the state and business leaders do not take action.

In Massachusetts, the number of unfilled jobs in manufacturing, information technology and health care could reach **25,000** by 2024.

Massachusetts is ripe for an industry-recognized credential program to address the skills gap and increase the career readiness of the state’s workforce pipeline.

The Information Technology and Computer Science sectors are fields where there is a growing need for skilled employees in Massachusetts now and in the future. There are 17 openings for every one graduate with a related bachelor’s degree. The skills required in these fields cut across sectors. Half of all programming openings are in industries outside of technology and include healthcare, advanced manufacturing and finance. There are credentials in each of these fields that are recognized by employers and can provide students with the technical skills to pursue employment in these pathways.

### **Unmet Demand for Career Vocational Technical Education**

Demand for the state’s career vocational technical schools (CVTE) is high and for good reason. CVTE schools have a track record of preparing students for both college and the workplace and are known to be responsive to labor market demands. Yet, only 20% of Massachusetts high school students are in a CTVE pathway. While students in other states earn industry-recognized credentials through CTE systems or other designated CTE pathways, in Massachusetts the only settings for students to earn these credentials are in CVTE and comprehensive high schools.

The Critical Importance of Vocational Education in the Commonwealth, a 2016 report highlighting employer and student feedback on CVTE schools, found that 75% of employers surveyed overwhelmingly preferred to hire graduates from CVTE schools or vocational programs for both entry-level (75%) and higher-level (61%) positions. More than 90% of employers surveyed see a need to increase the number of vocational high school graduates.<sup>viii</sup>

There are approximately 3,500 students on waitlists for vocational technical schools, with significant waitlists in Gateway Cities. The Governor and the Workforce Skills Cabinet have supported efforts to expand partnerships and collaborations between CVTE schools and traditional academic high schools to increase access. While these efforts have had a positive impact, they alone do not adequately address the needs of the larger student population in improving career preparation activities for all students.

CVTE schools are more expensive to operate due to smaller class sizes and greater equipment needs. The average per pupil cost for CVTE students is \$4,500 above the average per pupil cost for students in traditional high schools. The Massachusetts Budget and Policy Center estimated that it would cost \$27 million annually to expand CVTE schools to address the unmet need of approximately 3,200 students on the waitlist<sup>ix</sup>. Growth in partnerships and collaborations, while addressing some of the need, have not been sufficient in creating the capacity to increase access for the 80% of students presently without access to CVTE.

The recently enacted Massachusetts' Student Opportunity Act did not make direct, new investments in career vocational technical schools. However, the Legislature and the Baker Administration have allocated more funds toward School to Career Connecting Activities through the state budget process. An increase of almost \$350,000 in this current fiscal year elevated this line item to \$5.46 million annually. The Massachusetts Business Alliance for Education, through its Affiliates' network, advocated vigorously for this increase because it helps to provide students with career connected learning opportunities and to sustain school to business partnerships. As examined earlier in this report, business organizations are committed to expanding access to experiences like this and support the acquiring of industry-recognized credentials in order to increase the career readiness of the state's students.

Implementing an industry-recognized credential program in Massachusetts is an important strategy in dealing with the long waitlists for career and technical. Additionally, integrating the awarding of industry-recognized credentials into existing Massachusetts initiatives such as Early College or Innovation Pathways programs would serve as another innovative way to meet the needs of students.

## **Leveraging Massachusetts' Strengths for an Industry-Recognized Credential Program**

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The Commonwealth has engaged in several efforts that lay the foundation for establishing a credentials program.

### **Regional Labor Market Blueprints**

The state's Regional Labor Market Blueprints, produced in collaboration with workforce investment boards, local business, higher education and community organizations, provide an overview of the state's top five talent pipeline needs— Health care, Information Technology, Advanced Manufacturing, Finance and Business and Professional, Technical and Scientific – and more specific labor market demand by region.

In the Regional Labor Market Blueprints, each region outlines its top priority industries and high demand occupations. The top priority areas demonstrated in these Blueprints mirror the demands in other states – Information Technology, Healthcare and Manufacturing are high demand industries. Earning credentials in these fields can provide students a pathway to a high-wage occupation.

Region	Priority Industries	High Demand Occupations
<b>Greater Boston</b>	Healthcare and Social Assistance	Medical and Clinical Assistants Health Technologists Technicians Respiratory Technicians Nursing Aides
	Professional and Technical Services	Computer and Information Analysts Software Developers and Programmers Database Administrators and Network Architects Computer Support Specialists
<b>Berkshires</b>	Healthcare	Nurses and Nurses' Aides
	Advanced Manufacturing	Machinists Engineering Management
	Hospitality and Tourism	Chefs Management Waitresses Maids Housekeepers General Maintenance
<b>Cape and Islands</b>	Hospitality	Chefs and Head Cooks
	Healthcare	Licensed Practical and Licensed Vocational Nurses; Nursing Assistants
	Construction	Construction Laborers, Electricians, Plumbers, Construction and Building Inspectors, Front-Line Supervisors and Extraction Workers
	Education	Preschool Teachers and Teaching Assistants
<b>Central Massachusetts</b>	Healthcare	Registered Nurse Licensed Practical Nurse Certified Nursing Assistant Pharmacy Technician

		Direct Care Worker
	Manufacturing	CNC Machinist Quality Control Technician Production Worker
	Professional, Scientific and Technical	Software/Web Developer Cybersecurity Bio-manufacturing Technicians
<b>Northeast Regional</b>	Healthcare and Social Assistance	Healthcare Practitioners and Technical Direct Care and Support Healthcare Administration
	Professional, Scientific and Technical	Computer Related and IT Support Engineering Engineering Technician
	Advanced Manufacturing	Supervisor Assemblers Production Workers Machinists Inspectors Testers Quality Control
<b>Pioneer Valley</b>	Healthcare and Social Assistance	Registered Nurse Medical Assistants Dental Hygienists Occupational and Physical Therapists Medical Records/Health IT Physician Assistants
	Educational Services	Teachers (K-12) Teachers' Assistants
	Advanced Manufacturing	First-line Supervisor Machinist Computer Controlled Machine Operators Quality Control Workers
<b>Southeast Regional</b>	Healthcare and Social Assistance	Dental Hygienists and Assistants Radiologic Technologists Nursing Assistants Physical Therapy Assistants
	Professional, Scientific and Technical Services	Computer User Support Specialist
	Finance and Insurance	Customer Service Representatives

The state and higher education institutions have also engaged in additional endeavors to identify high-value credentials:

- Massachusetts is a member of the Credentials of Value Institute, a working group of 26 states which include the awarding of industry-recognized credentials as a component of their reporting or accountability systems for high school. This effort focuses on how states can identify and promote credentials of value.
- Massachusetts' MassHire Career Centers utilize the ACT National Career Readiness Certificate (NCRC). The ACT NCRC is a portable, evidenced-based credential that certifies that an employee has the essential skills for workplace success and also demonstrates college-level competency; it can earn the recipient college credit. This certificate is earned by completing three WorkKeys Assessments – Applied Math, Workplace Documents and Graphic Literacy.
- Massachusetts has engaged in an effort with the New England Board of Higher Education's High Value Credentials for New England project which seeks to provide individuals, institutions, state policy leaders and employers the tools to:
  - Utilize a common language to catalogue, connect and compare credentials;
  - Determine credentials' value in the labor market and society;
  - Identify critical education and employment pipelines; and
  - Understand the skills and competencies that make up credentials.<sup>x</sup>

These are important efforts, but they do not yet reach substantially into the K-12 system as other successful programs have done.

Massachusetts has several assets it can leverage to create an industry-recognized credential program aligned with employer demand. In considering the characteristics of strong credential programs in other states, the following are the strengths the Commonwealth brings to establishing a more formalized credential program.

### **High Quality College and Career Pathways**

In 2017, Massachusetts was awarded a \$1.95 million grant from JP Morgan Chase and Co. that helped launch the High Quality College and Career Pathways (HQCCP) initiative which includes two primary strategies – Early College and Innovation Pathways. These programs are intended to significantly expand student access to high quality career pathways and present opportunities for expanding access to high-value credentials.

Innovation Pathways and Early College programs present opportunities for expanding access to high-value credentials. The Innovation Pathway structure encourages credential preparation, but does not yet require students to earn a credential. Students participating in this program are already acquiring the knowledge and skills to potentially earn an industry-recognized credential through this pathway. The Early College pathway does not have a credential



preparation component, but similarly could be adapted to allow students to earn an industry-recognized credential in a field of study alongside their enrollment in early college courses.

### Examples of HQCCP Programs

Uxbridge High School has identified the labor market demand in its region and launched three **Innovation Pathway** programs in **Advanced Manufacturing, Biomedical Science, and Information Science/Digital Media**. These programs are meant to give students deep exposure to career pathways in these sectors and create strong partnerships with local employers.

The Southeastern Regional Vocational Technical School District is providing 300 hours per year of afterschool programming to Brockton students denied admission to Southeastern due to capacity limitations. Students who successfully complete the program will graduate with a **high school diploma, a vocational certificate, and industry-recognized credentials**.

- **Innovation Pathways**

Innovation Pathways (IP) are designed to connect student learning to a broadly-defined industry sector that is in-demand in the regional and state economy<sup>xi</sup>. Students must complete 100 hours of a career immersion experience in either an internship or capstone class upon graduation. Innovation Pathways are focused on five in-demand industry sectors identified in the state's Regional Blueprints – Healthcare, Information Technology, Advanced Manufacturing, Finance and Professional, Scientific and Technical. The Innovation Pathways program includes credential preparation, although the goal of this program is not for students to earn credentials.

- **Early College**

Early college programs are designed to blend elements of high school and college to provide students with the opportunity to experience and complete college level academic coursework (a minimum of 12 or more college credits) in a clearly articulated pathway and simultaneously gain exposure to a variety of career opportunities. The Early College program reduces the time and expense of earning a college degree.<sup>xii</sup> In 2018, nineteen schools received an Early College designation.

### Data Collection

The Department of Elementary and Secondary Education recently upgraded its data system to allow administrators to collect information that could include up to three individual credentials earned per student. In addition, a soon-to-be-formed Data Advisory Commission, required as part of the Student Opportunity Act, will be tasked with improving the use of state, district and school-level data to advise on effective resource allocations.

### Workforce Skills Cabinet

The state's Workforce Skills Cabinet, composed of the Executive Offices of Education, Labor and Workforce Development, and Housing and Economic Development, has been working to align skills with the needs of employers. As a result, the state has refocused its policies to increase

the emphasis on career and workforce readiness in support of the states' growing industries. For example, models are being developed to expand access to vocational technical education to students on waiting lists. This is made possible through planning and implementation grants. In 2019, six implementation grants were awarded.

### **MyCAP**

MyCAP (My Career and Academic Plan), a school-based career awareness and planning program, has resulted in an expansion of the development of six-year career plans for all students. There is now an accompanying career readiness curriculum, training for school teams on implementation and the MyCAP online system for students. The MyCAP system allows students to identify their talents and skills, identify post-secondary options and career and life goals, and actively design their own academic pathway aligned to those plans and goals.

This curriculum will allow for the integration of career planning within grades 6-12, providing students the opportunity to explore their interests and will provide early exposure to career pathways before high school.

### **Critical Next Steps**

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As this report highlights, Massachusetts already has in place many of the components necessary to move quickly and urgently to increase access to career readiness programs for all students and more specifically, toward the creation and expansion of a formalized system for awarding industry-recognized credentials in the state's high schools.

The opportunity to expand and scale up the awarding of industry-recognized credentials to students in Massachusetts will only be created through a combined effort by state government officials and agencies with private-sector business and industry leadership. Both the public and private sector will be required to play focused and concrete roles to achieve the goal of making a series of high-value, high-need credentials available for high school students to acquire in pursuit of the development of career pathways and post-graduate success.

Recommendations around creating an incentive, collecting a more robust set of data, identifying credentials that can be earned in high school and aligning them to demand, and communicating opportunities and benefits to students and parents are steps the Commonwealth should take, in collaboration with stakeholders, particularly the business community, to improve student readiness for the opportunities that await them.

Critical to the implementation of this work will be how business can play a role in leading and advocating for this work. The creation of a business-led Credentials for Success Program Actionable Report would facilitate the creation of a roadmap that could outline the policy and programmatic recommendations for how the business community can support the implementation of an industry-recognized credential program. Active business-sector engagement in the statewide conversation about the prioritization of certain high-value, high-

demand credentials and regional business participation in targeted efforts to design industry-specific partnerships.

### Create a Financial Incentive



Massachusetts should consider creating a financial incentive to motivate and mobilize districts across the state to integrate opportunities to earn credentials into their high school course offerings. A key learning from other states is that incentives work to grow program access. For example, there is proposed legislation in Massachusetts, House Bill 567, that would create a financial award for each student that earns a credential that has high employment value, is recognized by higher education institutions, and/or addresses regional workforce demands identified by the local MassHire Workforce Board. To ensure all districts have equal opportunity to participate, the bill includes start-up funding for implementation to encourage less well-resourced districts to get the programs up and running. The funds can support teacher training, and cover assessment costs or equipment needs.

### Ensure Alignment with State and Regional Labor Market Needs



Massachusetts can build off of the Regional Labor Market Blueprints by matching credentials to demand regionally and statewide. The business community can lead in this effort by verifying demand and identifying areas that may not be a top priority, but represent a critical need. Business partners can, and should, participate in the design of effective career and credential-awarding programs to ensure the appropriate and relevant skills are incorporated. Employers currently partnered with schools can serve as models for how to integrate labor market information and career activities to create strong partnerships that meet both students and business needs. This will be explored further in the next phase of the Credentials for Success Program Actionable Report.

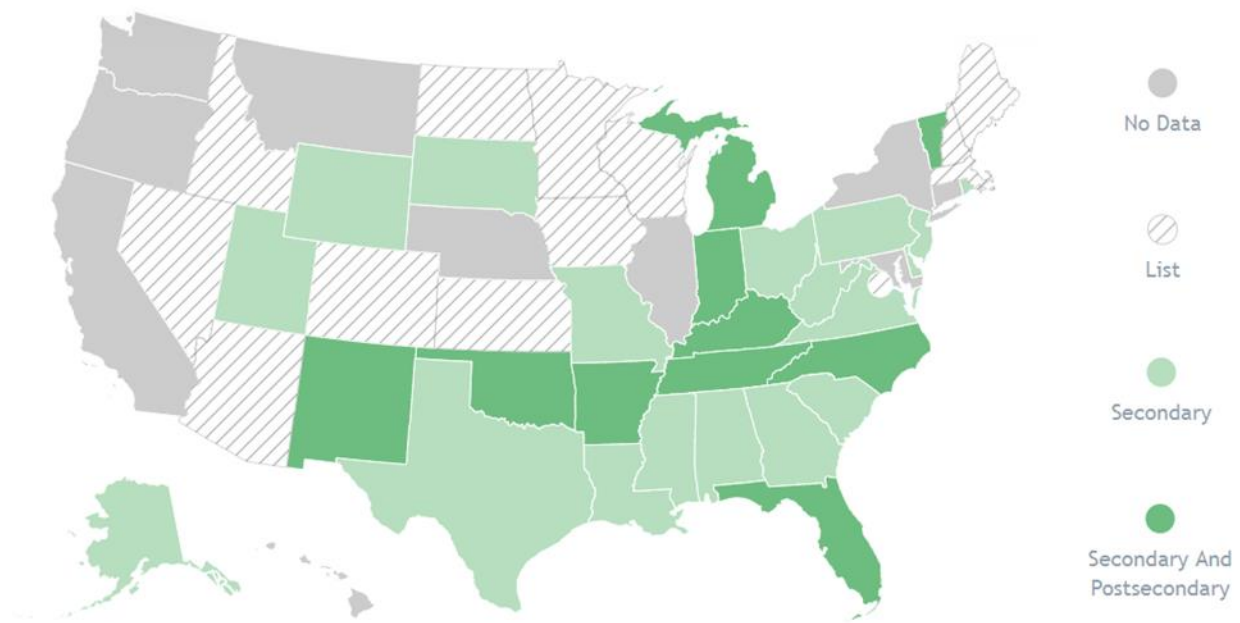
While the Regional Labor Market Blueprints begin that process for identifying higher education credentials, the state will need to identify and evaluate high-value credentials students can earn in high school, especially those that are stackable and lead to career pathways in the state's growing industries or those that may be eligible for college credit.

### Expand Data Collection and Reporting



Massachusetts should follow the lead of other states and implement policies that enable and require a much more robust set of college and career readiness and credential attainment data at the secondary and postsecondary level, compared with workforce demand information. The first step the state must take is to audit its programs for quality and alignment. This will serve to improve alignment between program offerings, credentials attained and workforce demands.

The collection of these data is important in identifying credentials of value and determining whether or not these credentials continue to hold value as students move on to higher education and/or transition into the workforce. Robust data collection will help the state determine the return on investment of a credential program for the state and for graduates.



How states collect data on credentials, ExcelinEd and Burning Glass Technologies, 2019

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**Data Collection Key**

- No Data indicates that the state does not collect individual credential attainment data nor maintain a list of promoted or achievable credentials.
  - ◌ List indicates the state does not collect individual credential attainment data. The state maintains a list of promoted or achievable credentials.
  - Secondary indicates that the state collects individual credential attainment data at the secondary level only.
  - Secondary and Postsecondary indicate that the state collects individual credential attainment data at the postsecondary level and the secondary level.
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Massachusetts may also want to consider how other states have created robust data systems that integrate labor market, workforce and school data together in one place like the Kentucky Center for Statistics (KY Stats). Maryland’s Longitudinal Data System produces annual, legislatively mandated reports on dual enrollment and career preparation. These systems help states align college and career readiness programs with employer demand.

The soon-to-be-formed Massachusetts Data Advisory Commission will have an opportunity to leverage its role and mandate to produce an annual report on the number of students currently earning credentials, the types of credentials earned, which industries these credentials fall into and whether these credentials are in alignment with the state’s high priority areas and current college and career readiness programs statewide. Further, the Data Advisory Commission, utilizing its statutorily defined authority, can and should connect the school level and labor

market data to specific post-graduate outcomes with regard to job placements, wage rates, and the filling of gaps to meet employer demand.

### **Facilitate Statewide Communication**



To create a successful industry-recognized credential program serving all high school students, a robust and multifaceted statewide communication strategy is essential. All avenues of communication should be identified, especially collaborative efforts with community and education organizations that work directly with students and families.

The Department of Labor and Workforce is able to, and therefore must, quantify that value and the Department of Elementary and Secondary Education can communicate it and integrate it into efforts like the MyCAP (My Career and Academic Plan) online system for students.

Once a list of high-value credentials is identified and verified in collaboration with employers, an annual list of these credentials should be made readily available to students, families, educators and the public.

The state should also develop additional opportunities to publicly communicate the value of these programs to students through public actions and statements from the Board of Elementary and Secondary Education, reports from the Data Advisory Commission and the support of the business community and organized community groups.

## Addendum

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### Massachusetts Regional Labor Market Blueprints

#### Greater Boston

- **Computer and mathematical occupations, health care practitioner and technical occupations** (requiring a sub-BA degree) ranked among the top in terms of intensity of the projected worker shortages. Management, business and finance operations, and community and social health care accounted for a large share of occupations that are projected to face similar shortages

#### Berkshire

- **Health Care:** As the largest and fastest growing industry in the Berkshires, Health Care and Social Assistance is vital to the Berkshire economy. With an aging population, the provision of health services will grow in importance and it will be necessary to continue to prepare a high-quality workforce. This industry also offers career pathways, has a supply gap in terms of more openings than applicants, is aligned with the Region's economic development strategies, and is a resilient industry.
- **Advanced Manufacturing:** As one of the Region's top five largest industries, Advanced Manufacturing is a priority for the Berkshires in terms of supporting the overall economy. The industry has experienced a consistent need for employees, is aligned with the Region's economic development plan, offers career pathways, and includes high growth, high wage occupations.
- **Hospitality/Tourism:** The Berkshires are well known as a tourist destination, with a focus on health and wellness. With a high location quotient for Arts, Entertainment, and Recreation, the area has a wide variety of resorts, hotels, cultural institutions, and recreation destinations. Building on this industry is important to the overall economy as it serves not only tourists but also builds on the quality of life for residents. This industry is also in line with the Region's economy development strategy, experiences supply gaps, and offers career pathways.

#### Cape and Islands

The most significant employee shortages in the region occur in the following occupational clusters and specific occupations:

- **Food Preparation and Serving Related Occupations**
  - Waiters and Waitresses; Cooks, Restaurant; Food Preparation Workers; Bartenders; Counter Attendants, Cafeteria, Food Concession, and Coffee Shop; Chefs and Head Cooks
- **Building and Grounds Cleaning and Maintenance**
  - Landscaping and Groundskeeping; Janitors and Cleaners; First Line Supervisors of Landscaping, Lawn, and Groundskeeping Workers
- **Personal Care and Service Occupations in the Health Care sector**
  - Childcare Workers; Personal Care Aides; Recreation Workers

- **Office and Administrative Support Occupations in the Health Care sector**
  - Office Clerks; Medical Secretaries; Receptionists and Information Clerks
- **Education, Training, and Library Occupations**
  - Teachers (multiple occupations)

### Central MA

The top occupations or occupational groups in which the region is facing the most significant employee shortages:

- **Health Occupations:** Certified Nursing Assistant, LPN, RN, Pharmacy Tech and Direct Care Worker
- **Manufacturing Occupations:** CNC Machinist, Quality Control Technician, Production Worker
- **Professional, Scientific, and Technical Services Occupations:** Software/Web Developer, Cyber Security, Bio-manufacturing Technicians
- **Transportation, Warehousing and Logistics Occupations:** Commercial Drivers; Diesel Technicians
- **Construction Occupations:** HVAC Mechanics, Apprenticeship Trade Occupations

### Northeast Regional

- **Construction:** The Construction industry has been identified as a critical industry for the Northeast region due to the significant demand pressure that is put on local systems to fill jobs when there are major projects. The industry also offers solid career pathways and opportunities for high wages. Within the Construction industry, the following are critical occupations:
  - HVAC mechanics, installers
  - Architectural and Civil Drafters
  - Construction Laborers and Other Trades
  - Heavy Equipment Operators,
  - Truck Drivers
  - Environmental Remediation
- **Education:** The Education industry is critical to the Northeast Region due to the solid career pathways that exist and the ongoing demand for educational service providers. The change in training requirements has put a strain on the industry's ability to attract and retain experienced teachers and that is impacting all areas of the economy as parents struggle with child care. Within the Education industry, the following are critical occupations:
  - Preschool Teachers
  - Teacher Assistants
  - Elementary Teachers
- **Life Sciences:** The Life Sciences sector is critical to the Northeast Region due to the role that it plays as a subset of the priority industries and the potential for high wages within the category. Within the Life Sciences industries, the following are critical occupations:
  - Lab Technicians
  - Lab Technologists

- Biological Technicians
- **Financial Services:** The Financial Services sector continues to be critical to the Northeast Region's economy due to the change nature of the industry and the increased demand for those with information technology skills throughout. Within the Financial Services industry, the following are critical occupations:
  - IT Occupations at all levels

### **Pioneer Valley**

According to data, research, and engagement, the top 3 labor supply challenges in this region are:

- Health Care and Social Assistance
  - Social & Human Service Assistants
  - Direct Care Workers such as Registered Nurses, Nursing and Medical Assistants, Personal Care Aides
  - Technical/Clinical Workers such as Dental Hygienists, Pharmacy Technicians, LPNs/LVNs, Medical Records/Health IT, Physician Assistants, Occupational and Physical Therapists
- Education Services
  - Educators including all levels, and all fields, including vocational-technical, STEM, and trades educators
  - Teachers' Assistants
- Advanced Manufacturing
  - Supervisors
  - Production Workers such as CNC Operators, Machinists
  - Inspectors, Testers, Quality Control Workers

### **Southeast Regional**

- Priority Industries and Occupations
  - Health Care and Social Assistance
    - Dental Hygienists
    - Radiologic Technologists
    - Nurse Practitioners
    - Nursing Assistants
    - Occupational Therapists
    - Physical Therapists
    - Physical Therapy Assistants
    - Personal Care Aides
    - Home Health Aides
  - Professional, Scientific & Technical Services
    - Computer User Support Specialist
  - Finance & Insurance
    - Office and Administrative Support Occupations
  - Critical Industries:



- Manufacturing
- Construction
- Emerging Industries

### How States Are Collecting Data on Credentials<sup>xiii</sup>

<b>Secondary and Postsecondary</b>	Arkansas Florida Indiana Kentucky Michigan	New Mexico North Carolina Oklahoma Tennessee Vermont
<b>Secondary</b>	Alabama Alaska Delaware Georgia Louisiana Mississippi Missouri New Jersey North Dakota	Ohio Pennsylvania Rhode Island South Carolina Texas Utah Virginia West Virginia Wyoming
<b>List</b>	Arizona Colorado District of Columbia Idaho Iowa Kansas Maine	Massachusetts Minnesota Nevada New Hampshire North Dakota Wisconsin
<b>No Data</b>	California Connecticut Illinois Maryland Montana	Nebraska New York Oregon Washington

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- ii ExcelinEd and Burning Glass Technologies. [Credentials Matter Report 1: A National Landscape of High School Student Credential Attainment Compared to Workforce Demand](#). May 2019
- iii ExcelinEd and Burning Glass Technologies. [Credentials Matter Report 1: A National Landscape of High School Student Credential Attainment Compared to Workforce Demand](#). May 2019
- iv Churchill, Aaron. [Most Ohio Students Aren't Earning Industry Credentials. Why?](#). Ohio Gadfly Daily. Thomas B. Fordham Institute.
- v Ohio Department of Education. High School Industry-Recognized Credentials Initiative. [http://education.ohio.gov/getattachment/Topics/Ohio-s-Graduation-Requirements/Industry-Recognized-Credentials-and-WorkKeys/ICPrelimInformation10-28\\_Final.pdf.aspx?lang=en-US](http://education.ohio.gov/getattachment/Topics/Ohio-s-Graduation-Requirements/Industry-Recognized-Credentials-and-WorkKeys/ICPrelimInformation10-28_Final.pdf.aspx?lang=en-US). 2019.
- vi [Improving Student Pathways: The Essential Role of the Business Community](#). ExcelinEd. July 2019.
- vii Ohio Department of Education. Industry-recognized Credentials and Work Keys. <http://education.ohio.gov/Topics/Ohio-s-Graduation-Requirements/Industry-Recognized-Credentials-and-WorkKeys/Industry-Recognized-Credentials>
- viii Tumber, Catherine. [The Critical Importance of Vocational Education in the Commonwealth](#). Northeastern University School of Public Policy and Urban Affairs Dukakis Center for Urban and Regional Policy. January 2016.
- ix Jones, Colin. [Skills for our Future: Vocational Education in Massachusetts](#). Massachusetts Budget and Policy Center. May 9, 2017.
- x High Value Credentials for New England. New England Board of Higher Education. December 2019.
- xi Massachusetts Early College Pathway and Innovation Pathways. Massachusetts Department of Elementary and Secondary Education. [http://www.mssaa.org/gen/mssaa\\_generated\\_bin/documents/basic\\_module/early\\_college\\_pathways\\_072717.pdf](http://www.mssaa.org/gen/mssaa_generated_bin/documents/basic_module/early_college_pathways_072717.pdf). 2017
- xii Massachusetts Early College Pathway and Innovation Pathways. Massachusetts Department of Elementary and Secondary Education. [http://www.mssaa.org/gen/mssaa\\_generated\\_bin/documents/basic\\_module/early\\_college\\_pathways\\_072717.pdf](http://www.mssaa.org/gen/mssaa_generated_bin/documents/basic_module/early_college_pathways_072717.pdf). 2017
- xiii Credentials Matter: The State of Credentials. ExcelinEd and Burning Glass Technologies. 2019. <https://www.credentialsmatter.org/>